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ABSTRACT

In investigating emotional phenomena in humans, overt-behavioral, self-report, and physiological responses all often seem to be appropriate measures. However, experience has shown that these different kinds of response often do not vary together. It may be that these measures disagree because they are related to different underlying variables. To illustrate how overt-behavioral and physiological responses appear to be influenced by different kinds of variables, several studies of sex differences in emotional responding are reviewed. These indicate that, in certain emotional situations, females appear to respond more than males on overt-behavioral measures, while males show larger physiological responding. In situations involving aggression, in contrast, males show more overt responding while females show greater physiological reactions. The data suggest that the overt-behavioral responses are in fact affected directly by social expectations, while the physiological measures are not. It is concluded that different sets of variables must underlie overt-behavioral and physiological responses, and that the relationships between different kinds of emotional responding deserve further study. (Author/TA)

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Differences in Social Learning Underlying Overt-behavioral, Self-report, and Physiological Responses to Emotion

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When attempting to measure emotional phenomena in humans, the psychologist is faced with a choice of measurement techniques. In the investigation of the response to a fear-arousing situation, for example, one might choose an overt-behavioral measure of withdrawal behavior, a self-report measure of the responder's subjective experience of "fear" in the situation, or a physiological measure of the responder's state of arousal. It is sometimes argued that, since overt-behavioral, self-report, and physiological measures presumably reflect the same affective process, they should vary together. However, they often do not (Martin, 1961). Not only are there wide individual differences in the tendency to respond on a given measure, but the magnitude of response on one measure is not necessarily associated with the response on another.

The simplest way to resolve this dilemma is to choose and analyze only a single measure, thus eliminating any problems posed by the complex relationships between overt-behavioral, self-report, and physiological measures. However, there is no adequate rationale for deciding what kind of measure is the most appropriate in a given situation. Furthermore, it is possible that these different measures represent different aspects of a complex multidimensional process, and that they cannot be expected to vary together because they are affected by different underlying variables. This paper will suggest a possible basis for this difference between

variables: the difference in the "visibility" of overt behavior, subjective experience,and physiological responding during the social learning process.

The Social Learning of Emotional Responding

The degree to which a response can be perceived by the responder and by people around him is an important property of a response that is often ignored. Some responses, particularly most overt-behavioral responses, are quite obvious both to the responder and to people around him. Other responses, particularly the responder's subjective feelings, are perceptible to the responder but not to people around him unless the responder makes a self-report. Still other responses, particularly physiological reactions, are normally not apparent to anyone without special equipment. The degree to which a response is normally visible and apparent to the responder and to people around him will be referred to as the "visibility" of that response.

This visibility dimension has important implications for a social learning analysis of the development of emotional responding. Social learning theory emphasizes the role of imitation and social reinforcement in the development of response patterns (Bandura and Walters, 1963). This implies that responses with different degrees of visibility must be associated with different patterns of social learning experience. Consider overt-behavioral events. These can be easily seen both by the responder in other persons and by others in the responder, and they therefore can undergo thorough training through imitation and social reinforcement. A child can see and learn directly from the overt emotional behaviors of his parents, and the parents

can "shape" the overt behaviors of the child via social reinforcement. Thus, in the development of his overt emotional responding, a child can learn to make many discriminations about how a given emotion may be expressed appropriately, which emotions may be expressed and which may not, and so on. These overt responses should reflect the child's learning about what kinds of emotional responding others expect of him.

This kind of fine discrimination learning can apply only to relatively "visible" manifestations of emotions. It cannot apply, for example, to the subjective feelings associated with emotions. A child can learn directly from the overt behaviors of his parents, but he has no direct access to their subjective emotional experiences, and they have no direct access to his. In this case, the child's learning must take place indirectly, through the verbal reports and descriptions of subjective experience that the child gains from others, and the reports that he gives to others. For example, the child might learn to correctly identify and label his feelings of fear or anger by repeated direct and vicarious experience with situations which arouse such feelings and label them appropriately. When he is overtly expressing his anger, a parent might say, "I see you are angry," or he may see others overtly angry and hear them describe their feelings as anger. Such indirect learning may be necessary for the child to develop a valid set of cognitive labels and expectations with which to categorize and label his subjective experience (Schachter, 1964).

While the learning of overt responses involves highly differentiated instruction via imitation and reinforcement, and the learning of the meaning of subjective events implies a process of connecting one's private experiences with cognitive labels and interpretations, physiological re-

sponses must be associated with a still different kind of social learning experience. Most physiological events take place outside of conscious awareness, so that a child would not ordinarily learn to identify or label them. But they can evidently be modified by learning experiences. Both Russian studies of interoceptive conditioning and recent American experiments indicate that subtle physiological responses are quite readily conditionable (Miller, 1969; Brozek, 1964; Razran, 1961), and other investigators have demonstrated that such conditioning can be vicarious as well as direct (Berger, 1962). This suggests that conditioning involving physiological events is a constant process, and that a given person's physiological response in a given situation may be determined in great part by his conditioning history in similar kinds of situations. The more conditioned (or unconditioned) stimuli for physiological arousal in the situation, the higher the arousal will be. Thus, if a child has many threatening experiences in situations involving anger, it is likely that he will show arousal in similar situations as an adult.

To summarize, this analysis suggests that the differences between the variables underlying overt-behavioral, self-report, and physiological measures may be due in part to the differences between the visibility of these responses. Responses differing in visibility are associated with fundamentally different kinds of social learning: the less visible the response, the less available it is to fine discriminative learning through imitation and social reinforcement. For the normally "invisible" physiological responses, the only kind of learning that is generally possible is that through direct and vicarious conditioning procedures.

This analysis implies that overt-behavioral, self-report, and physiological responses should be related to different features of the emotional

situation. For the sake of simplicity, the following discussion will focus only on overt-behavioral and physiological responses. Overt-behavioral responses, since they are most subject to discrimination learning via imitation and social reinforcement, should be closely related to the responder's perceptions about what behavior is appropriate and expected by others. Physiological responses, since they are a function of past conditioning experiences, should be related to the overall "threat" or "stress" in the situation to that particular person.

It might be noted that this argument does not predict any specific relationship between overt-behavioral, self-report, and physiological responses. Instead, it implies that they may vary somewhat independently of one another, since the kinds of learning underlying them are different. For example, two individuals might both have threatening experiences in anger-arousing situations that cause them to manifest strong physiological arousal later when in similar situations. This does not necessarily mean that they would or would not engage in aggressive behavior. One of them might have learned to make overt aggressive responses in his particular social learning environment, while the other may have learned to respond passively.

There are a number of experiments whose results are relevant to the issues raised in this analysis. In particular, several studies dealing with sex differences in the response to emotional situations can be examined from this point of view.

Sex Differences in Emotional Responding

A number of studies have reported sex differences in the tendency to respond on overt-behavioral and physiological measures in emotion-

arousing situations. There is evidence, for example, that females show smaller physiological responses than males in certain experimental situations involving painful stimuli. Graham, Cohen, and Shomavonian (1966), and Shomavonian, Yarmat, and Cohen (1965) report higher skin conductance levels, more spontaneous skin conductance responses, more skin conductance discrimination, and greater vasomotor responsivity in men than women in classical conditioning situations involving shock. Similarly, Craig and Lowrey (1969) report more vicarious skin resistance changes for males than females in a task involving watching another person being shocked.

Although males appear to have larger physiological responses than females in these studies, there is evidence that males are less reactive than females on more "visible" indicants of emotionality. Thus, males will generally choose to take more intense shocks than females. Also, males in the Craig and Lowrey (1969) study rated themselves as feeling less uncomfortable while watching the other person take the shocks than did the females, even though the physiological responses of the males were greater.

Studies of the communication of emotion via facial expressions suggest a similar pattern. A number of studies have demonstrated a negative relationship between the extent to which a person is overtly expressive, and the size of his skin conductance responses (Jones, 1960; Buck, Savin, Miller, and Caul, 1969; Lanzetta and Kleck, 1970). Jones (1960) used the term "externalizer" to describe a person relatively high in overt responding and low in skin conductance responding, and the term "internalizer" to describe the opposite pattern of responding. The available evidence indicates that males tend to be "internalizers" in communication situations, having relatively little overt facial response but somewhat more frequent

skin conductance responses, while females tend to be "externalizers (Black, 1969;Buck, et al., 1969)."

The occurrence of these sex differences suggests that sex role learning may be important in the development of the response to emotion-arousing situations, but that it affects overt-behavioral and physiological responses in different ways. Females may well learn to express their feelings more overtly than males in our culture, at least in the kinds of emotional situations we have been discussing. This effect shows in the overt-behavioral measures, but not the physiological responses, because only the overt responses are accessible to thorough training via social reinforcement.

This suggests that, given a situation in which males are encouraged to be more expressive than females, it should be the females that have the decreased overt, but not necessarily physiological, responses. A situation involving aggression seems to meet that criterion for our culture: although males are expected to show less overt expression than females in most emotion-arousing situations, they are generally allowed more overt expression in aggressive situations (Brown, 1964).

Studies by Buss and Brock (1963; 1966) indicated that male students did, in fact, express more intense overt aggression than females in their experimental situation. On physiological measures, on the other hand, when student subjects were led to believe that they were giving shocks to another person in a situation approximately comparable to that of Buss and Brock, females had larger skin conductance responses than males (Buck, 1970).

Taken together, these results suggest that in many emotion-arousing situations, males had less of an overt-behavioral response but a higher

physiological response than females. However, in aggressive situations, this pattern was reversed, with males showing relatively high overt but low physiological responding. These data seem consistent with the notion that the effects of social expectations are seen directly in overt-behavioral responses. Both males and females respond overtly in accordance with the prevailing sex role expectations in our society. The physiological responses, however,did not behave in accordance with social expectations. If anything, they appeared to be negatively related to overt-behavioral responding in some cases. The adequate exploration of this negative relationship is beyond the scope of this paper, but one possible explanation seems consistent with the argument we have been considering. Perhaps there is a tendency for the social learning experiences associated with learning to inhibit overt emotional responding to be more unpleasant and threatening than the social learning experiences associated with learning to be expressive. There would then be a tendency for more stimuli conditioned to arousal to be present in situations in which the individual learned to inhibit his overt-behavioral responding. For example, it may be that a young boy who learns from others to inhibit his overt response to pain tends to undergo more threat and stress than a girl who learns that overt responding is acceptable. The presence of this threat may eventually lead to more pronounced physiological responding in the boy.

Summary and Conclusions

This paper has suggested a visibility of response explanation as a step toward conceptualizing the difference between responding on overt-behavioral and physiological measures, and it has used several studies on sex differences in emotional responding to illustrate the potential utility

of this analysis. The experimental evidence that we have considered is scanty and inconclusive, and the particular interpretations and explanations must be regarded as highly tentative. But regardless of the validity of this analysis of response visibility, the available experimental findings make it clear that overt-behavioral and physiological measures reflect different aspects of the complex psychological states associated with emotion. Such a different pattern of response emerges when both overt-behavioral and physiological responses are taken that it must be concluded that different sets of variables underlie the two kinds of response. The nature of the difference between these variables cannot be understood until multiple measures are taken during a wide variety of emotional states,and their inter-relationships are more firmly established.

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